REMARKS

I. Introduction

Reconsideration of the rejection imposed in the June 17, 2004 Office Action in view of following remarks is respectfully requested. Claims 1 through 6, and 9 through 14 are pending in this application.

For the reasons set forth below, Applicants respectfully submit that all pending claims are in condition for allowance.

II. Request For Expungement

In the pending Office Action, the Examiner asserts that "there are enablement issues in the specification if the loss is category 2 (total attenuation), because it is not clear from the prior art how the total attenuation losses of the module at the 1550 nm wavelength being of not more than 0.035 dB per unit kilometer of the optical transmission fiber can be obtained, and that there is nothing in the specification which would enable one of ordinary skill in the art to obtain a fiber with such total attenuation parameters without undue experimentation."

First, the Examiner did not impose a rejection under the first paragraph of 35 U.S.C. § 112 for lack of adequate enablement. This being the case, the Examiner's statements regarding enablement issues is improper and without his authority. Accordingly, Applicants request the issuance of a new Office Action and that the June 17, 2004 Office Action be expunged from the record.

At any rate, as discussed in the previous Amendment filed March 16, 2004, the loss of the dispersion compensating fiber that can compensate the chromatic dispersion of the

optical transmission fiber at the 1550 nm wavelength is 2.8 dB at the 1550 nm wavelength, as readily illustrated in Examples 3 and 4 of Table I at page 9 of the specification. Indeed, it is disclosed that the optical transmission fiber of Examples 3 and 4 has a length of 80 km. Accordingly, the loss of the module at the 1550 nm wavelength per unit kilometer of the optical transmission fiber can be calculated by dividing the loss of 2.8 dB by 80 km, which arrives at the limitation of "0.035 dB/km," as recited in claims 1 and 6.

During a telephonic interview conducted on February 18, 2004, the Examiner acknowledged that the limitation of "0.035 dB/km per unit kilometer" as recited in claims 1 and 6 finds adequate descriptive support in the originally filed disclosure within the meaning of the first paragraph 35 U.S.C. §112. Accordingly, the objection imposed under Enablement is not legally appropriate and, hence, Applicants solicit withdrawal thereof.

The Examiner also is directed to **M.P.E.P § 2164.01** under the subsection entitled "**Test of Enablement**," which sets forth the applicable standard:

> Any analysis of whether a particular claim is supported by the disclosure in an application requires a determination of whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention. ("The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation."). **A patent need not teach, and preferably omits, what is well known in the art.** *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987); and *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984). **The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation.** *In re Certain Limited-Charge Cell Culture Microcarriers*, 221 USPQ 1165, 1174 (Int'l Trade Comm"n 1983), *aff'd. sub nom., Massachusetts Institute of Technology v. A.B. Fortia*, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985). See also *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404.

In the instant case, the Examiner asserts that "there is nothing in the specification which would enable one of ordinary skill in the art to obtain a fiber with such total attenuation parameters without undue experimentation." However, it is respectfully submitted that the fact that the calculation required to arrive at the claimed subject matter may be complex does not necessarily make it undue, if the art typically engages in such calculations. Indeed, as previously stated at page 9 of the Amendment filed on March 16, 2004, the loss per unit kilometer of 0.035 dB/km can be calculated from Examples 3 and 4 of Table I and at page 9, lines 3 through 9 of the specification. Accordingly, the Examiner's gratuitous comments regarding enablement are not legally viable, and should be withdrawn of and expunged from the record.

III. The Rejection Of Claims 1-6, and 9-15 Under 35 U.S.C. § 103(a)

Claims 1 through 6, and 9 through 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over USP No. 6,263,138 in view of USP No. 5,905,838 to Judy. Applicants respectfully traverse this rejection for at least the following reasons.

Claims 1, 6 and 9 relate to an optical transmission line comprising an optical transmission fiber having a chromatic dispersion of +4 to +10 $ps \cdot nm^{-1} \cdot km^{-1}$ and a dispersion slope of 0 to +0.04 $ps \cdot nm^{-2} \cdot km^{-1}$ at the 1550 nm wavelength and installed in a relay section; and a module made of a dispersion compensating optical fiber having a chromatic dispersion of -40 $ps \cdot nm^{-1} \cdot km^{-1}$ or less and a dispersion slope of -0.10 $ps \cdot nm^{-2} \cdot km^{-1}$ or less at the 1550 nm wavelength. Additionally, claims 1 and 6 recite that the dispersion compensating optical fiber has a length that is sufficient to substantially compensate the

chromatic dispersion of the optical transmission fiber at the 1550 nm wavelength and loss of the module at the 1550 nm wavelength is not more than 0.035dB per unit kilometer of the optical transmission fiber, while claim 9 recites that an average chromatic dispersion of the optical transmission line is not less than -2 ps/nm/km and not more than 2 ps/nm/km from 1.5 μm to 1.6 μm inclusive.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the ***claimed invention*** where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *Ecolochem Inc. v. Southern California Edison Co., 227 F.3rd 1361, 56 U.S.P.Q.2d (BNA) 1065 (Fed. Cir. 2000); In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2D (BNA) 1614, 1617 (Fed. Cir. 1999); In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992).* See also **M.P.E.P § 2143.01**.

Specifically, in accordance with an embodiment of the present invention, the optical transmission system 1 of the present invention comprises **repeater modules** 31 and 32 having dispersion compensating fibers 313 and 323 interposed between the optical amplifiers 311 and 312, and 321 and 322, respectively, while the optical transmission fiber 41 is installed **in a relay section** from the repeater module 31 to the repeater module 32 (see, page 6, lines 7 to 17 of the specification).

Turning to the cited prior art, the line fiber section 3 of Sillard is asserted to correspond to the claimed optical transmission fiber, while the dispersion compensating fiber section 4 of Sillard is asserted to correspond to the claimed dispersion compensating optical fiber. As illustrated in Fig. 4, Sillard discloses a set point index profile of a fiber

comprising a line fiber section 3 and a dispersion compensation fiber section 4 interposed between two amplifiers 1 and 2. As such, Sillard specifically discloses a fiber comprising two sections for compensating the cumulative dispersion in the fiber (see, col. 7, lines 45-63).

However, Sillard is silent to any relay section, as recited in the rejected claims. Therefore, one having an ordinary skill in the art is not motivated to modify the present invention by Sillard or Judy. Indeed, the Examiner has not pointed to any teaching in the prior art that even mentions or recognizes any relay section, let alone suggest that the line fiber section 3 corresponding to the claimed optical transmission fiber is installed in a relay section. Nor has the Examiner identified, as judicially required, which element of Sillard or Judy corresponds to the claimed relay section. Thus, at a minimum, Sillard and Judy, taken alone or in combination, do not disclose or suggest an optical transmission fiber installed ***in a relay section***, as recited in claims 1, 6 and 9.

Furthermore, in accordance with an embodiment of the present invention, the optical transmission system 1 utilizes a repeater module 31 made of a dispersion compensating optical fiber 313, where the module 31 includes an optical amplifier 311 positioned at the first part of the dispersion compensating optical fiber 313, and an optical amplifier 312 provided at the latter part of the dispersion compensating optical fiber 313. In particular, the sign of the chromatic dispersion of the optical transmission fiber 41 and that of each of the dispersion compensating optical fibers differs from each other.

However, Sillard discloses utilizing **a line fiber section 3 (i.e. not a repeater module)**, and **a dispersion compensation fiber section 4 as a line fiber** for compensating the positive chromatic dispersion introduced in the line fiber section 3 (see, Abstract, col. 3,

lines 19-38 and col. 7, lines 26-28). As such, since Sillard specifically discloses using the dispersion compensating fiber section 4 as a line fiber, and that the repeater module of the present invention is different from dispersion compensation fiber section 4 disclosed in Sillard, the optical transmission fiber of Sillard is fundamentally different from the optical transmission system of the present invention.

Indeed, nowhere do Sillard and Judy, taken alone or in combination, disclose or suggest utilizing **repeater modules** made of dispersion compensation fibers or optical amplifiers. Sillard merely discloses using an optical transmission fiber comprising a first section having a line fiber and a second section having a dispersion compensating fiber used as a line fiber for compensating dispersion, but does not disclose or suggest using repeater modules for doing so. Thus, at a minimum, Sillard fails to disclose or suggest a module made of a dispersion compensating optical fiber, as recited by the rejected claims.

Moreover, in accordance with the present invention, the optical transmission fiber has a chromatic dispersion of **+4 to +10 ps·nm^{-1}·km^{-1}** and a dispersion slope of **0 to +0.04 ps·nm^{-2}·km^{-1}** at the 1550 nm wavelength, while the module made of a dispersion compensating optical fiber has a chromatic dispersion of **-40 ps·nm^{-1}·km^{-1} or less** and a dispersion slope of **-0.10 ps·nm^{-2}·km^{-1} or less** at the 1550 nm wavelength.

The Examiner alleges that Sillard discloses, at col. 3, lines 19 to 31 and col. 7, lines 27-35, a line fiber section 3 having a chromatic dispersion in the range of 4 to 10 ps/(nm·km), and at col. 6, lines 14 to 30 and col. 7, lines 25 to 60, and a dispersion compensating optical fiber section 4 having a chromatic dispersion of -40 ps/(nm·km) or less and a dispersion slope of -0.10 ps/(nm·km) or less at the 1550 nm wavelength (see, page 4 of Office Action).

In contrast to the conclusion set forth in the pending rejection, Sillard discloses a line fiber section 3 having a chromatic dispersion in the range of 6 ps/(nm·km) to 10 ps/(nm·km) at 1550 nm wavelength, a chromatic dispersion slope less than 0.07 ps/(nm^2·km) and an effective area greater than or equal to 60 μm^2, and a dispersion compensation fiber section 4 having a chromatic dispersion less than -40 ps/(nm·km), or less than or equal to -50 ps/(nm·km) at 1550 nm, a negative chromatic dispersion in the range of 50 nm to 230 nm, and an effective area greater than 12 μm^2 (see, col. 3, lines 19-30).

In other words, Sillard discloses a line fiber section 3 having a chromatic dispersion in the range of ***6*** to 10 ps/(nm·km), and a dispersion compensating fiber section 4 having a dispersion slope of **-0.35 ps/(nm·km), -0.51 ps/(nm·km) or -0.76 ps/(nm·km)** (see, col. 6, line 20, line 56 and col. 7, line 11).

Thus, since the chromatic dispersion of the line fiber section 3 and the dispersion slope of the dispersion compensating fiber section 4 of Sillard do not encompass or overlap the claimed range as recited by claims 1, 6 and 9, at a minimum, Sillard or Judy, taken alone or in combination, does not disclose or suggest an optical transmission fiber having a chromatic dispersion of ***4*** to 10 ps·nm^{-1}·km^{-1}, and a module made of a dispersion compensating optical fiber having a dispersion slope of **-0.10 ps·nm^{-2}·km^{-1} or less** at the 1550 nm wavelength.

Further, the Examiner asserts that Sillard "teaches the loss of the module/section at the 1550 nm wavelength is not more than 0.035 dB per unit kilometer of the optical transmission fiber" by using the attenuation due to curvature of the dispersion compensating optical fiber section 4. Specifically, the Examiner calculates the attenuation due to the

curvature of the dispersion compensating optical fiber section 4 to be $5.31*10^{-4}$dB/km, and concludes that Sillard yields a loss of $7.43*10^{-3}$dB at 1550 nm.

However, the Examiner has not pointed out where in the Sillard reference this specific loss of $7.43*10^{-3}$dB is disclosed using the method suggested by the Examiner. **Reliance on common knowledge does not discharge the Examiner's obligation to provide factual support for conclusions**. *In re Lee* , 277 F.3d 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). See also *In re Thrift*, 298 F.3d 1357, 63 USPQ2d 2002, (Fed. Cir. 2002). Indeed, the Examiner's own fabricated method of calculating the claimed loss is without support by the disclosure of Sillard. Regardless of the source of motivation, the Examiner must still provide facts. See *Teleflex, Inc.v. Ficosa N. Am Corp.*, 299 F.3d 1313, 63 USPQ.2d 1374 (Fed. Cir. 2002).

Moreover, the teachings of the prior art do not establish that the chromatic dispersion, dispersion slope or the attenuation loss of the claimed optical transmission fiber or the module made of a dispersion compensating optical fiber is an art-recognized result effective variable with respect to compensating the loss of the module or the average chromatic dispersion of the optical transmission line. See *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980). The Examiner has not presented any fact-based cogent scientific reasoning to support the conclusion that one having ordinary skill in the art would have found the claimed invention as a whole obvious within the meaning of 35 U.S.C. § 103.

Therefore, the Examiner's conclusion as to the claim ranges is without any evidentiary foundation, particularly since Sillard's optical transmission fiber requires two line-fiber sections 3 and 4, which is different from the claimed repeater module made of a

dispersion compensating optical fiber interposed between the optical amplifiers, so that the positive chromatic dispersion of the line fiber section 3 can be compensated by the dispersion compensating optical fiber section 4 used as another line fiber. I

In addition, Sillard discloses **a curvature loss of the dispersion compensating fiber section 4**, rather than **a total attenuation loss of a module** made of a dispersion compensating optical fiber. Thus, at a minimum, Sillard does not disclose or suggest that the loss of the module is not more than 0.035 dB, as recited by claims 1 and 6.

Even assuming *augendo* that the loss of $7.43*10^{-3}$dB calculated using the Examiner's own fabricated method is supported by Sillard, and that the curvature loss of the dispersion compensating fiber section 4 can be applied to the total attenuation loss of the alleged module, **it is not apparent and the Examiner has not identified where Sillard does it suggest or contemplate the relationship between the loss of the line fiber section and the dispersion compensating fiber section**. Indeed, Sillard does not appear to even discuss that the total attenuation loss of the line fiber section 3 is less than (i.e. not more than) the loss of the dispersion compensation fiber section 4.

In contrast, the loss of the repeater modules 31 and 32 of the present invention is less than 0.035 dB/km ***of the optical transmission fiber 41***, and not just merely less than 0.035 dB in the manner asserted by the Examiner. Thus, at a minimum, Sillard fails to disclose or suggest that the loss of the module is not more than 0.035 dB per unit kilometer ***of*** said optical transmission fiber, as recited by claims 1 and 6.

Further, claim 9 recites that the average chromatic dispersion of the optical transmission line 41 is not less than -2 ps/nm/km and not more than 2 ps/nm/km from 1.5

μm to 1.6 μm inclusive. The Examiner alleges that Sillard discloses, at col. 7, lines 49-54, that the average chromatic dispersion in the transmission line is zero.

However, in contrast to the Examiner's assertion, Sillard discloses that the cumulative chromatic dispersion for the **1550 nm** (i.e. not the inclusive range of **1.5 μm to 1.6 μm**) channel of the multiplex is close to 0 ps/nm, while in the range of **1530 nm to 1620 nm**, the cumulative chromatic dispersion is less than **50 ps/nm (i.e. more than 2ps/nm/km)** for each channel for the 100 km of the first and second sections (see, col. 4, lines 25-28 and col. 7, lines 54-59).

In other words, Sillard specifically discloses that while the chromatic dispersion at the 1550 nm wavelength is close to 0 ps/nm, the average chromatic dispersion of the first and second sections at the range of 1530 nm to 1620 nm is less than 50 ps/nm. As such, Sillard does not disclose or suggest an inclusive range of 1.5 μm to 1.6 μm (i.e. **1500 nm to 1600 nm, and not 1530 to 1620 nm**), let alone suggest that the average chromatic dispersion is not less than -2 ps/nm/km and not more than 2 ps/nm/km. Judy does not, and the Examiner has not relied on Judy to cure this deficiency. Thus, at a minimum, Sillard does not disclose or suggest that the average chromatic dispersion of the optical transmission line is not less than -2 ps/nm/km and not more than 2 ps/nm/km from 1.5 μm to 1.6 μm inclusive, as recited by claim 9.

The Examiner is further directed to **M.P.E.P § 2143.01** under the subsection entitled "Fact that the Claimed Invention is Within the Capabilities of One of Ordinary Skill in the Art is Not Sufficient by Itself to Establish *Prima Facie* Obviousness", which sets forth the applicable standard:

> A statement that modifications of the prior art to meet the claimed invention would have been [obvious] because the references relied upon teach that all

> aspects of the claimed invention were ***individually*** known in the art is ***not*** sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. (citing *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)).

In the instant case, even assuming *arguendo* that Sillard and Judy "teach that all aspects of the claimed invention [are] individually known in the art," it is submitted that such a conclusion "is not sufficient to establish a *prima facie* case of obviousness" because there is no ***objective*** reason on the record to combine the teachings of the cited prior art. In contrast, the record is devoid of any factual basis to support the idea of ***combining*** the claim elements so as to remedy the problem recognized by the present invention. Applicants also submit that the requisite fact-based motivation element has **not** been established. Specifically, the Examiner has not actually explained **why** based on **facts**, one having ordinary skill in the art would somehow have been led to proceed **against** the specific teachings of Sillard to arrive at the claimed ranges as recited by the rejected claims. **The Examiner has not established a fact-based reason to modify the ranges of Sillard**.

At best, the Examiner has attempted to show only that the elements (i.e., the optical amplifiers, the chromatic dispersion and dispersion slope) of the claimed invention are ***individually*** known without providing a *prima facie* showing of obviousness that the ***combination*** of elements recited in the claims is suggested in the art (e.g. an optical transmission fiber installed in a relay section having a chromatic dispersion of +4 to +10 $ps \cdot nm^{-1} \cdot km^{-1}$, a module made of a dispersion compensating optical fiber having a dispersion slope of -0.10 $ps \cdot nm^{-2} \cdot km^{-1}$ or less at the 1550 nm wavelength, wherein the dispersion compensating optical fiber has a length that is sufficient to substantially compensate the chromatic dispersion of the optical transmission fiber at the 1550 nm wavelength and loss of the module at the 1550 nm wavelength is not more than 0.035dB per unit kilometer of the

optical transmission fiber, or wherein an average chromatic dispersion of the optical transmission line is not less than -2 ps/nm/km and not more than 2 ps/nm/km from 1.5 μm to 1.6 μm inclusive).

Indeed, in accordance with the present invention, the chromatic dispersion and dispersion slope of the optical transmission fiber, the chromatic dispersion and dispersion slope of the dispersion compensating optical fiber, and the length and the loss of the optical transmission fiber and dispersion compensating optical fiber must be set in a manner such that the relationships recited in claims 1, 6 and 9 are satisfied to thereby achieve a broad bandwidth WDM transmission as well as realize a high bit rate transmission (see, e.g. page 7, lines 14-15, and page 8, line 14 of the specification).

As such, even though the Examiner has illustrated portions of the claim elements, Sillard or Judy, taken alone or in combination, still fails to cure the problem recognized by the present invention, for example, retraining the occurrence of the nonlinear optical phenomenon (see, page 8, line 14 of the specification). As such, it is respectfully submitted that the present invention is patentably distinct over the cited prior art.

For at least the foregoing reasons, Applicants, therefore, submit that the imposed rejection of claims 1, 6, 9 and any of the claims dependent thereon under 35 U.S.C. §103 for obviousness predicated upon Sillard is not factually or legally viable and, hence, solicit withdrawal thereof.

IV. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co., 819 F.2d at 1100, 1108 (Fed. Cir. 1987).* Accordingly, as claims 1 and 9 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

For all of the foregoing reasons, it is submitted that claims 2 through 6, and 10 through 15 are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejections of claims 1 through 6, and 9 through 15 under 35 U.S.C. § 103 be withdrawn.

Further, claims 4 and 13 recite that the dispersion compensating optical fiber has a chromatic dispersion of **-80 ps·nm^{1}·km^{-1} or less** and a dispersion slope of **-0.20 ps·nm^{-2}·km^{-1} or less**, while claim 10 recites that the average chromatic dispersion of the optical transmission line is **not less than -1 ps/nm/km and not more than 1 ps/nm/km** from **1.5 μm to 1.6 μm** inclusive.

However, as discussed above, Sillard discloses a dispersion compensating fiber section 4 having a chromatic dispersion of **-50 ps·nm^{-2}·km^{-1} or less** and a dispersion slope of **-0.35 ps/(nm·km), -0.51 ps/(nm·km) or -0.76 ps/(nm·km)** (see, col. 3, line 47 to 48, col. 6, line 20, line 56 and col. 7, line 11), and that the cumulative chromatic dispersion of the optical transmission fiber is less than **50 ps/nm (i.e. more than 1ps/nm/km)** in the range

of **1530 nm to 1620 nm** (i.e. not in the range of 1500 nm to 1600 nm) (see, col. 4, lines 25-28 and col. 7, lines 54-59).

Thus, since the alleged chromatic dispersion and dispersion slope of the dispersion compensating fiber, and the cumulative chromatic dispersion of the optical transmission fiber do not fall within the claimed range as recited in claims 4, 10 and 13, Applicants, therefore, submit that the imposed rejection of claims 4, 10 and 13 under 35 U.S.C. §103 for obviousness predicated upon Sillard is not factually or legally viable and, hence, solicit withdrawal thereof..

V. Conclusion

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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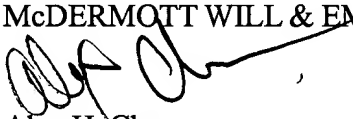

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